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Scientific Realism in Constitutional Law

David L. Faigman[†]

I. INTRODUCTION

In scholarly circles a debate rages over whether scientific research describes true underlying realities of the natural world or merely represents constructed accounts of observed events.¹ Much of this debate involves natural science and reaches such fundamental issues as whether, for example, we can positively conclude that electrons exist or must be limited to statements about the observed effects of electrons, since we cannot observe those subatomic particles directly. Scientific realists argue that science is not simply a collection of hypotheses supported by empirical tests, but actually describes an underlying reality that exists outside of human observers. The world, according to this view, is “mind independent.” The core philosophical disagreement found in the natural sciences can also be found in the many other disciplines in which knowledge about the empirical world is essential, from the social sciences to the humanities, only more so. Any mind-dependence infecting physics would impair the social sciences and humanities at many times the rate. Not surprisingly, therefore, the law, as a consumer of these empirically conscious disciplines, is deeply affected by these debates and, to some extent, must choose sides. In the law, the question whether reality is real or not is more than an academic debate. The law’s response to this debate has, not to put too fine an ironic point on it, substantial real-world consequences.

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¹ See generally JAMES ROBERT BROWN, WHO RULES IN SCIENCE: AN OPINIONATED GUIDE TO THE WARS (2001); STATHIS PSILLOS, SCIENTIFIC REALISM: HOW SCIENCE TRACKS TRUTH (1999); MICHAEL DEVITT, REALISM AND TRUTH (2d ed. 1991).

A diversity of views is represented by the label “scientific realism.” Among the choices of philosophical starting premises, however, realism most centrally embraces the notion that science discovers “truth.” Truth, albeit with a lowercase *t*, does not necessarily imply that scientists can say unambiguously or with certainty that the world operates in a particular fashion. Rather, the world exists in particular ways, and science more or less—or with greater or lesser precision—endeavors to describe that world. But science is a human enterprise and a community effort. The real truth, therefore, may be known only rarely and, even then, only after extensive study and many missteps. Still, its existence largely makes the scientific effort worthwhile. Scientific methods permit the development of a body of knowledge about the world that does not depend on the cultural backgrounds or values of its originators. In common parlance, science can be “objective,” in that it can be tested “inter-subjectively” by different people in different places having different values.² Realists believe that scientific methods provide an objective lens through which the world can be described, if only imprecisely.³

Challenges to realism come from a wide assortment of disciplines, including, among others, philosophy, sociology, and literary theory. Critical scholars in these fields⁴ contest the objectivity of knowledge and dispute the claim of mind-independence that realists believe is possible.⁵ While there are indeed widely ranging views regarding the inscrutable issue of the reality of “truth,” necessity requires a simpler presentation of the debate in this essay. From the law’s perspective—and, more particularly, from the perspective of constitutional adjudication—the matter comes down to either believing that science can describe the empirical world largely free of bias or that it cannot. If facts having relevance to constitutional lawmaking do not exist—or cannot be described—separately from the values endemic in that lawmaking, then it is

² KARL POPPER, *THE LOGIC OF SCIENTIFIC DISCOVERY* 44 (Harper & Row 1968) (1959) (“[T]he *objectivity* of scientific statements lies in the fact that they can be *inter-subjectively tested*.” (emphasis in original)).

³ See generally WILLIAM P. ALSTON, *A REALIST CONCEPTION OF TRUTH* (1996).

⁴ See generally BROWN, *supra* note 1.

⁵ Professor Susan Haack refers to them as the “New Cynics.” She notes that they disagree among themselves “on the finer points,” but generally agree that “concern for truth, is a kind of illusion, a smokescreen disguising the operations of power, politics, and rhetoric.” SUSAN HAACK, *DEFENDING SCIENCE—WITHIN REASON* 20-21 (2003).

incumbent on courts not to pretend that they do. Facts and values (or biases), under this view, may not be one, but they are inextricably bound. If this is so, anti-realism is the more rational choice to provide the philosophical basis for constitutional adjudication. But if facts can exist independently of biasing influences, as I believe they can, then courts should fully account for them in their decisions. In short, scientific realism obligates courts to take facts seriously.⁶

The anti-realist claim that must be rebutted in order to substantiate my argument that facts ought to be taken seriously in constitutional cases is associated with the belief that scientific knowledge is largely socially constructed. Adherents of social constructionism fall along a wide spectrum of beliefs, with some subscribing to more or less extreme versions. Indeed, many realists share the concerns that lie at the core of anti-realist critiques of science. Scientific realists well appreciate, for example, the effects a researcher's values might have on how hypotheses are formed or what methods are selected to test them. Similarly, realists generally accept, at least in principle, Thomas Kuhn's basic claim that theoretical paradigms affect the problems scientists study and the answers they obtain.⁷ To a large extent, the difference between sober realists and sensible anti-realists is one of degree or emphasis. Anti-realists generally hold the view that scientific statements are so imbued with the values and social and historical contexts of their declarants that they are effectively normative in scope. They deny any special claim of "objectivity" to scientific facts and, in effect, deny the fact-value distinction altogether.

⁶ Although the perspective to be defended here is the realist one, as opposed to anti-realist and social constructivist alternatives, I need not defend a strong version of this perspective. For example, scientific realism is sometimes juxtaposed to empiricism. Whereas scientific realists posit the true existence of unobservable entities, empiricists are content to be agnostic about underlying realities, though still committed to the rationality of hypothesis formation and test. The empiricist tradition thus seeks to demonstrate "that theoretical discourse may be so construed that it does not commit to the existence of unobservable entities." PSILLOS, *supra* note 1, at 3. In contrast, the realist tradition "aims to show that a full and just explication of theoretical discourse in science requires commitment to the existence of unobservable entities." *Id.* From the law's perspective, however, this particular debate is academic, since empiricists and realists agree on the virtue of rigorous hypothesis testing. Empiricism and realism share the attribute that I refer to as taking facts seriously. Compared to strong anti-realist views, therefore, realism and empiricism are close cousins.

⁷ See THOMAS KUHN, *THE STRUCTURE OF SCIENTIFIC REVOLUTIONS* 43-51 (1970); see also BROWN, *supra* note 1, at 63-71 (discussing Kuhn and realists' responses to him).

Realists, in contrast, believe that the world exists independently of the minds of its explorers and that the methods of science are largely effective in discovering the mechanics of that world. While biases can—and too often do—infect the explorations of scientists, scientific methods are designed and employed to limit that bias as much as possible. Hence, when failures occur, as they have and inevitably will, they are attributable to the scientists, not science. The solution is to strive for better scientific research, not abandon the enterprise.

Although the United States Supreme Court is an eminently realist institution in that the justices almost certainly see themselves as situated in a mind-independent real world, the Court tends to employ facts as though they were subjects of social construction. The Court insistently employs factual arguments rhetorically, as premises that can be manipulated or massaged in the service of one or another legal outcome.⁸ The Court has largely constructed an empirical world that serves the normative vision it holds for the Constitution. For example, it may be that the Fourth Amendment right to be free from unreasonable search and seizure is defined in light of an “objective” person’s “reasonable expectations of privacy,”⁹ but the justices make no attempt to match the empirical reality of such expectations with constitutional outcomes. The Court’s subjective construction of those expectations establishes the contours of the Fourth Amendment right. The justices, therefore, stand in the untenable position of subscribing to scientific realism as a foundational philosophy, but act as anti-realists in crafting constitutional outcomes. To vary an old saying, they want to have their cake and make us eat it too.

In this Essay, I examine whether facts can be treated realistically in constitutional decision making. In particular, I consider two potentially insurmountable challenges to a scientifically realist constitutional jurisprudence. The first is the question of whether the sorts of facts the Constitution makes relevant—primarily behavioral and societal facts studied by social scientists—can be studied relatively objectively. The second is whether the constitutional inquiries in which facts play a part are hopeless conglomerations, so that

⁸ See David L. Faigman, “Normative Constitutional Fact-Finding”: *Exploring the Empirical Component of Constitutional Interpretation*, 139 U. PA. L. REV. 541, 549-50 (1991).

⁹ See, e.g., *Bond v. United States*, 529 U.S. 334, 338-39 (2000).

the empirical and the normative cannot be separated. I conclude that while both of these issues present formidable challenges, neither is fatal to the development of a scientifically realist constitutional jurisprudence.

II. REALIZING A SCIENTIFICALLY REALISTIC JURISPRUDENCE

It must be emphasized at the outset that believing that scientists study true underlying realities says little about the value of a particular research program for the law. Although some fact may be “true,” this does not mean that particular legal consequences flow from that “truth.” The law is an applied discipline and so the issue of whether genes truly exist, for example, does not answer the question of how, or even whether, research indicating some genetic predisposition is legally cognizable. In the simplest of terms, “is” does not entail “ought.” At its best, science has no particular political agenda. For instance, discovering a genetic basis for pedophilia might have multiple legal impacts, variously having “liberal” or “conservative” consequences. For instance, this genetic evidence may be used by defendants to support an insanity plea or by prosecutors to establish guilt; both defense lawyers and prosecutors may use this proof at sentencing; and the state will undoubtedly seek to use this sort of evidence in commitment hearings of alleged sexually violent predators. Good science is neither inherently liberal nor conservative.

It is also important to emphasize that applied science is invariably variable. What is “true” generally will be true only some of the time in practice.¹⁰ The “truth” of the empirical connection between genes and pedophilia is not the ultimate question in most legal disputes. While the general truth is certainly pertinent, the operative issue typically will be whether some particular person has acted (or will act in the

¹⁰ It is worth noting that even general “truths” in science are provisional, or uncertain, in a variety of ways. General findings are only as good as the research supporting them and, especially in the behavioral sciences, are usually described probabilistically. For example, psychologists have found that cross-racial identifications are less reliable than same-race identifications. See Christian A. Meissner & John C. Brigham, *Thirty Years of Investigating the Own-Race Bias in Memory for Faces: A Meta-Analytic Review*, 7 PSYCHOL. PUB. POL’Y & L. 3, 4 (2001). Although this is a well-researched phenomenon, it is not invariable. See Stephanie J. Platz & Harmon M. Hosch, *Cross-Racial/Ethnic Eyewitness Identification: A Field Study*, 18 J. APPLIED SOC. PSYCH. 972, 972-73 (1988). In addition, even the best believed scientific truths might someday be overturned by new discoveries or more inclusive theories.

future) in accordance with this genetic predisposition. However true the underlying reality, this knowledge will be probabilistic in application. As with virtually all applied science, research will at best illuminate the statistical relations between factors. Moreover, in most cases, the hypothesized empirical connection, itself probabilistically described, will be clouded by the possibility of factors never studied and systematic and random error endemic to any research program. Research, for example, might indicate that forty-five percent of men with a specific set of, say, thirteen genes will be sexual aggressors. This, of course, would be highly relevant information. Yet, fifty-five percent of men with these genes will not be sexual aggressors. It may be that environmental factors or other variables partly explain which men will act on their seeming predispositions and which will not. Whatever the case, when it comes to individual statements of fact, the best that scientists can do is speak in terms of probabilities and statistics.

The probabilistic character of applied science is an inherent limitation of the discipline. The tools of science, therefore, are limited in their capacity to describe the world that the law regulates. Importantly, however, the uncertainty, or error, associated with scientific tools is primarily random rather than systematic. In other words, the error is randomly distributed among political outcomes and does not systematically prefer the conclusions particular researchers might favor.

The anti-realist critique is directed at the prospect of systematic error. Anti-realists believe that researchers' subjective biases infuse the design and interpretation of their work. They do not believe reality exists separately from researchers' statements. The reality is in the words, not the world. To many in the law, however, asking whether constitutional facts are mind-independent will strike them as patently absurd. Indeed, even among anti-realists, the strong version of the claim is truly endorsed by only a small group of skeptics, and one might wonder how strongly even they believe it. Even the most ardent anti-realists look both ways when they cross the street. But a somewhat weaker form of anti-realism might have a place in constitutional cases. This is so for two independent reasons.

First, many of the facts having constitutional significance come from the so-called softer disciplines of psychiatry, psychology, economics, political science, and sociology. These fields have a history of producing socially dependent knowledge and employ methods that limit their power to

transcend time, place, and setting. Unlike many of the natural sciences, these fields tend to produce results that are weak in explanatory power, methodological rigor, and demonstrated reproducibility.

The second reason to believe that a weak form of anti-realism has a place in constitutional cases is that, in practice, the Court tends to amalgamate constitutional facts and constitutional norms. For example, in *Planned Parenthood of Southeastern Pennsylvania v. Casey*, the Court held that pre-viability abortion regulations violate the Constitution if they “unduly burden” the right of reproductive choice.¹¹ The Court defined as unduly burdensome laws that create a “substantial obstacle” to the exercise of the right.¹² Whether a law places obstacles in the path of a woman’s exercise of her right to an abortion is an empirical question. Whether these obstacles qualify as *substantial* obstacles—enough to create an *undue* burden—is a question that contains a strong normative component. The undue burden standard, therefore, creates a constitutional problem that is an admixture of fact and value, and thus arguably contemplates a socially constructed answer.

This section considers the two basic forms of anti-realism as they might be manifested in constitutional cases. Due to space considerations, the following discussion is limited to social science, which is the predominant form of science found in constitutional cases. Also, if the case is made successfully with social science, its more muscular cousins should pass philosophical muster easily.¹³ Part A first considers whether the social sciences can achieve some measure of objectivity. Part B then considers whether constitutional standards, such as the undue burden test of *Casey*, can be untangled so that the factual elements can be examined independently of the normative insights that inform them.

¹¹ *Planned Parenthood of Se. Pa. v. Casey*, 505 U.S. 833, 876 (1992).

¹² *Id.* at 846.

¹³ This essay focuses on science; space constraints preclude my consideration of history, the penultimate (and possibly ultimate) source of factual information in constitutional cases. In the admittedly misleading hierarchy of objectivity, if the methods of natural science allow it to be more objective than social science, the methods of social science allow it to be more objective than history. Hence, on balance, the anti-realist critique resonates somewhat more with historical “truth” than scientific “truth”—though good history is much more than mere social constructions.

A. *Soft Science and Social Construction*

Implicit or explicit in virtually all discussions of the significance of social science findings to legal decision-making lies the question of whether social inquiry can be scientific. Perhaps the most often repeated criticism of social science is that it is inherently value laden.¹⁴ A component of this argument is based on the truism that, as human beings, social scientists study themselves. Social scientists bring too much baggage of their own to the laboratory, the argument goes, to be able to study other people's behavior objectively. Without question, social scientists' values affect the kinds of research they do and, at least indirectly, their findings. This is true of the natural sciences as well. The topics selected for study, the variables identified as worthy of measurement, and, to some extent, the interpretation of findings, depend on the values, interests, and intentions of the scientist and the times in which he or she lives. The principal advantage of scientific methods is not that they eliminate researchers' biases, only that they help to control and reveal the biases that do exist.

Essentially six basic sources of bias in social inquiry can be readily identified: (1) the selection of problems, (2) the definition of the subject of study, (3) the methodological choices made, (4) the determination of the contents of conclusions, (5) the division of fact from value, and (6) the assessment of evidence.¹⁵ Although these six sources of bias constitute significant challenges to social scientific inquiry, they do not doom the project.

1. Selecting Problems

Social scientists have long been criticized for spending a disproportionate amount of time on law-related issues about which the law cares relatively little. For example, researchers' efforts to study juries is out of all proportion either to the

¹⁴ See Martha L. Fineman & Anne Opie, *The Uses of Social Science Data in Legal Policymaking: Custody Determinations at Divorce*, 1987 WIS. L. REV. 107, 127; David M. O'Brien, *The Seduction of the Judiciary: Social Science and the Courts*, 64 JUDICATURE 8, 12 (1980); see also Harry Willmer Jones, *Legal Inquiry and the Methods of Science*, in LAW AND THE SOCIAL ROLE OF SCIENCE 120, 128-29 (Harry Willmer Jones ed., 1966).

¹⁵ This section owes a considerable intellectual debt to Professor Ernst Nagel, who posited—and refuted—several of these sources of bias in his extraordinary book *The Structure of Science*. See generally ERNST NAGEL, *THE STRUCTURE OF SCIENCE: PROBLEMS IN THE LOGIC OF SCIENTIFIC EXPLANATION* (1961).

number of trials or to the number of trials involving juries. Additionally, a brief perusal of the social science and law literature would suggest that eyewitness identification is the most important empirical issue facing the legal system.¹⁶ Although social scientists have increasingly expanded their research focus to new areas of the law,¹⁷ it remains fair to complain that they concentrate inordinately on juries, witnesses, and criminals. Behavioral issues in other areas, such as constitutional law, torts, and property, are largely ignored.

Not surprisingly, social scientists tend to select problems on the basis of their interests, their understanding of the law, and the amenability of the problems to scientific study. Thus, the proliferation of studies on eyewitness identification is understandable, in that it flows naturally from a long history of research on human perception and memory. Also, a non-lawyer can easily understand the danger of eyewitness misidentification and its importance to the law.¹⁸ Thus, unlike complex legal and psychological issues, such as the coercive impact of religiously inspired prayer at graduation ceremonies,¹⁹ eyewitness perception requires little legal sophistication and is relatively easy to research. Moreover, the eyewitness research literature has been an influential component of public policy debates and has led to a variety of contemporary reforms.²⁰ Psychologists interested in having an impact on public policy, therefore, have naturally focused on a subject as readily amenable to study as eyewitness identification.

Criticism of problem selection in the social sciences should be directed more at the possible lack of relevance of the research and less at the inherent value bias of the researchers. In general, scientists select problems on the basis of what seems important, and to this extent all science is culture-

¹⁶ See Michael J. Saks, *The Law Does Not Live By Eyewitness Testimony Alone*, 10 LAW & HUM. BEHAV. 279, 279 (1986). But see Wallace D. Loh, *Psycholegal Research: Past and Present*, 79 MICH. L. REV. 659, 678 (1981).

¹⁷ Outside of jury and eyewitness work, promising areas of study include children's memory, predictions of future violence, judgment and decision-making, and fMRI brain research.

¹⁸ See Elizabeth F. Loftus, *Reconstructing Memory: The Incredible Eyewitness*, 15 JURIMETRICS J. 188, 190 (1975) ("Since eyewitness testimony carries so much weight, it is important to find out why distortion occurs in a witness' memory.").

¹⁹ See *Lee v. Weisman*, 505 U.S. 577, 592-93 (1992) (applying what Justice Scalia called the "psychological coercion" test to measure Establishment Clause violations, *id.* at 632 (Scalia, J., dissenting)).

²⁰ See, e.g., TECHNICAL WORKING GROUP FOR EYEWITNESS EVIDENCE, U.S. DEPT OF JUSTICE, EYEWITNESS EVIDENCE: A GUIDE FOR LAW ENFORCEMENT 3 (Oct. 1999), available at <http://www.ncjrs.gov/pdffiles1/nij/178240.pdf>.

bound. But in the context of science and law, the criticism that scientists' biases influence the hypotheses they test is particularly misplaced. In the end, it is the law that dictates which hypotheses merit study.

In *Witherspoon v. Illinois*, for example, the Court considered the question of the constitutionality of an Illinois statute providing that "[i]n trials for murder it shall be a cause for challenge of any juror who shall, on being examined, state that he has conscientious scruples against capital punishment, or that he is opposed to the same."²¹ The challenger argued that common sense and the research available indicated that excluding jurors who oppose capital punishment (called "*Witherspoon*-excludables") would result in a jury biased in favor of conviction. Justice Stewart, writing for the Court, agreed that this empirical question was constitutionally relevant and deplored the lack of data to answer it:

The data adduced by the petitioner . . . are too tentative and fragmentary to establish that jurors not opposed to the death penalty tend to favor the prosecution in the determination of guilt. We simply cannot conclude, either on the basis of the record now before us or as a matter of judicial notice, that the exclusion of jurors opposed to capital punishment results in an unrepresentative jury on the issue of guilt or substantially increases the risk of conviction.²²

The *Witherspoon* Court, therefore, left open the question whether research might yet demonstrate that excluding those opposed to capital punishment from the guilt-phase of capital trials might produce panels that have a propensity for finding defendants guilty: "[A] defendant convicted by such a jury in some future case might still attempt to establish that the jury was less than neutral with respect to *guilt*."²³

²¹ *Witherspoon v. Illinois*, 391 U.S. 510, 512 (1968) (quoting 38 ILL. REV. STAT. § 743 (1959) (current version at 38 ILL. COMP. STAT. ANN. 5/115-4(d) (West 2007))). A juror can be excused for cause only if he or she opposes the death penalty and would be unable to set aside those scruples and follow applicable law. *Wainwright v. Witt*, 469 U.S. 412, 424 (1985). The determination whether a particular juror is excludable is within the discretion of the trial court and is owed deference on appeal. *Uttecht v. Brown*, 127 S. Ct. 2218, 2224 (2007).

²² *Witherspoon*, 391 U.S. at 517-18.

²³ *Id.* at 520 n.18 (emphasis in original). The Court continued as follows: "If he were to succeed in that effort, the question would then arise whether the State's interest in submitting the penalty issue to a jury capable of imposing capital punishment may be vindicated at the expense of the defendant's interest in a completely fair determination of guilt or innocence" *Id.*

The social science community's response to the Court's entreaty was extraordinary.²⁴ Social scientists conducted more than a dozen reported studies on the effects of excluding jurors opposed to capital punishment.²⁵ The near-consensus of the investigators and reviewers of this research corroborated the intuitive judgment of the petitioner in *Witherspoon* that excluding death-qualified jurors would result in conviction prone juries.²⁶ The courts, therefore, have the power to influence the social science agenda. There is no question that an explicit, or even a veiled, call for data will cause social scientists to come to the Court's assistance.

Whether such assistance will be heeded, or heeded well, is something that, history suggests, is questionable at best. Social scientists' *Witherspoon* experience well illustrates the dangers associated with taking seriously the Court's expressions of interest in data. In *Lockhart v. McCree*, the Court rejected both the validity and the relevance of the many studies done in response to the *Witherspoon* Court's call for research.²⁷ On the one hand, Chief Justice (then Justice) Rehnquist repudiated the validity of the fifteen studies McCree had introduced because of "several serious flaws"²⁸ Rehnquist found in the research.²⁹ On the other hand, Rehnquist stated that even assuming the validity of this research, "the Constitution does not prohibit the States from 'death qualifying' juries in capital cases."³⁰ In effect, Rehnquist's

²⁴ See Michael Finch & Mark Ferraro, *The Empirical Challenge to Death-Qualified Juries: On Further Examination*, 65 NEB. L. REV. 21, 24 (1986) ("In the seventeen years following *Witherspoon*, death qualification has been one of the most studied subjects in the area of sociological jurisprudence."). See generally William C. Thompson, *Death Qualification After Wainwright v. Witt and Lockhart v. McCree*, 13 LAW & HUM. BEHAV. 185 (1989) (analyzing the Court's treatment of social science in constitutional litigation concerning death qualification and discussing the future role of such research).

²⁵ Finch & Ferraro, *supra* note 24, at 24-25.

²⁶ Finch and Ferraro reported that the data supported three hypotheses:

(1) jurors excluded because of their inability to impose the death penalty are more attitudinally disposed to favor the accused than are non-excluded jurors; (2) excluded jurors are more likely to be black or female than non-excluded jurors; and (3) excluded jurors are more likely to actually acquit the accused than are non-excluded jurors.

Id. at 25.

²⁷ 476 U.S. 162, 168-69, 171-72 (1986).

²⁸ *Id.* at 168-69.

²⁹ For an in-depth discussion of these "flaws," see Faigman, *supra* note 8, at 590-92.

³⁰ *Lockhart*, 476 U.S. at 173.

Lockhart decision repudiated Stevens's legal analysis in *Witherspoon*, and found that the research was irrelevant to the applicable constitutional provisions—the Sixth and Fourteenth Amendments—that applied in the case.³¹

Although it is true that studying a phenomenon gives it status,³² lawmakers remain the ultimate arbiters of a phenomenon's importance. In most cases, researchers take their cue from the agenda set by lawmakers. Even when social scientists are ahead of the law in identifying and studying factors of possible importance, lawmakers must independently assess the legal relevance of the factors identified. Certainly, policymakers should never defer to social scientists' ordering of phenomena, just as they must guard against singling out for reliance certain factors simply because these factors have been the subject of scientific testing. As long as lawmakers are deciding the areas of importance, however, they have no ground to criticize the researchers' fidelity.

2. Defining the Subject of Study

Underlying the realist perspective is the key methodological tool of replication. If cold fusion exists, for example, it should be demonstrable whether the researchers are in Provo, Palo Alto, or Princeton. The first lesson of scientific publication is that enough detail must be provided so that a reader could replicate the study. This requirement serves two essential functions. First, it permits what Karl Popper called inter-subjective testability.³³ If the research findings have merit, other researchers in other settings should be able to obtain substantially the same results. Second, and of special concern to the law, this requirement informs readers regarding how the researchers concretely defined the object of their study. An essential step in science, therefore, is to make amorphous concepts concrete for the purpose of study by defining them operationally.³⁴

The need to operationally define terms is pervasive in science, whether it is physics or psychology. Consider concepts such as persistent vegetative state, intelligence, deterrence,

³¹ See Faigman, *supra* note 8, at 594-95 (discussing the Sixth and Fourteenth Amendment standards set forth in *Lockhart*).

³² See Fineman & Opie, *supra* note 14, at 125 n.50.

³³ POPPER, *supra* note 2, at 44.

³⁴ See PSILLOS, *supra* note 1, at 5.

bio-diversity, competence, violence, prurient interest, viability, involuntary euthanasia, reasonable expectations of privacy, and so forth. These terms are not self-defining. Scientists must somehow make concrete, for purposes of measurement, the vague and indefinite concepts of the law. Notions of justice, fairness, and equality are hardly self-defining. They must be operationally defined. Herbert Feigl nicely explained the matter as follows:

To put it briefly, if crudely, operational analysis is to enable us to decide whether a given term in the way it is used, has a "cash value," i.e., factual reference. If it does have factual reference, operational analysis is to show us precisely what that factual reference is, in terms, ultimately, of the data of direct observation.³⁵

The issue of defining abstract concepts operationally is not unique to social science. Moreover, usually there is some choice involved in how something should be operationalized, and a researcher should be obligated to explain why he or she made one decision rather than another. Consider the simple example of temperature. Temperature cannot be directly observed, but might be operationally defined as "the linear expansion of a mercury column in a glass tube of even width."³⁶ But this time-honored mode is not the only way to measure how hot or cold it is outside. For example, meteorologists might measure temperature by "windchill." Windchill combines thermometer readings with wind speed and takes into account physiological factors, such as heat loss from the body (i.e., modern heat transfer theory).³⁷

An indispensable part of evaluating any scientific research program ostensibly relevant to a legal matter, therefore, requires that lawyers ensure that the researchers studied the phenomenon that the law is interested in having studied. Consider, for example, the issue of children's competency to make complex decisions, an issue that arises in a multitude of constitutional contexts.³⁸ How can we be sure that the "competence" the courts speak about is the same

³⁵ Herbert Feigl, *Operationism and Scientific Method*, 52 PSYCHOL. REV. 250, 252-53 (1945) (emphasis in original).

³⁶ *Id.* at 254.

³⁷ For an excellent discussion of wind chill, including conversion charts, see Nat'l Weather Serv., Windchill: Frequently Asked Questions, Terms and Definitions, <http://www.weather.gov/om/windchill/index.shtml> (last visited Sept. 12, 2007).

³⁸ See, e.g., *Roper v. Simmons*, 543 U.S. 551 (2005) (requiring competency to be executed); *Parham v. J.R.*, 442 U.S. 584 (1979) (requiring competency to consent to hospitalization in a mental facility).

“competence” the social scientists measured in their research? The short answer to this question is that we cannot be sure; but a court can compare what the social scientists did with its own conception of competence. For example, in evaluating juveniles’ “competency” to waive their *Miranda* rights, Professor Thomas Grisso identified primarily three components of competency reflected in the legal literature: (1) comprehension of rights, (2) beliefs about legal context, and (3) problem solving style.³⁹ Since Professor Grisso’s tests of competency are based on courts’ explanations of the concept, courts might be expected to find his results to be of some assistance to their original inquiry. The important point is that such a comparison can be made. Whether the psychological measure of competence adequately meets the legal conception of competence, therefore, can be evaluated by lawmakers who want to rely on the science. Hence, the law must, initially, identify the concept of interest and, in the end, decide whether scientists who have studied the concept of interest have done so adequately.

3. Methodological Choices Made

Science does not exist as a separate repository into which all well-founded knowledge is poured. Science is a dynamic enterprise that spans subject areas ranging from the lowly microbe to the grand universe. The scientific method, therefore, is not one method. It is an orientation or approach to empirical exploration.⁴⁰ Different subjects demand different modes of analysis. Both electrons and electricians can be topics of scientific inquiry, but the particle physicists and industrial-organizational psychologists who study these respective subjects necessarily use very different techniques. But within areas of study, not all methods are equal, and they are not all employed equally well. Some methods provide brilliant probes into the operation of phenomena and others offer little more than dim glimpses of fleeting truths. Science, across the disciplinary landscape, from acoustics to zoology, is marked by

³⁹ Thomas Grisso, *Juveniles’ Waiver of Rights: Legal and Psychological Competence*, in 3 PERSPECTIVES IN LAW AND PSYCHOLOGY 41-58 (Bruce Dennis Sales ed., 1981); see also Lois A. Weithorn & Susan B. Campbell, *The Competency of Children and Adolescents to Make Informed Treatment Decisions*, 53 CHILD DEV. 1589, 1594-95 (1982) (evaluating competency on four scales: evidence of choice, reasonable outcome, rational reasons, and understanding).

⁴⁰ See HAACK, *supra* note 5, at 10 (“There is no distinctive, timeless ‘scientific method,’ only the modes of inference and procedures common to all serious inquiry.”).

methodological variability. An approach that is appropriate, or even possible, for a problem in celestial mechanics may be entirely inapplicable for a problem in cellular biology. Indeed, very often in science, a single paradigm will not be sufficient to study any particular phenomenon. New drugs are tested first in laboratory animals and second on humans, and both methods are tools of science.

Since scientific knowledge—or “the truth”—is only as good as the methods that researchers bring to bear to discover it, it behooves judges and lawyers to have some sophistication about those methods.⁴¹ The law, of course, relies on a wide assortment of scientific expertise, so it might be unrealistic to expect that judges will be able to develop proficiency in all of them. For example, the American Psychological Association’s amicus brief in the juvenile death penalty case of *Roper v. Simmons* advanced data from behavioral studies conducted by psychologists and brain-imaging studies done by neuroscientists.⁴² How can judges be expected to be critical consumers of such disparate forms of science?

The short answer is that they have no choice. The real question is not whether they can do it, but how they should go about doing it. The science exists and judicial decisions that ignore the empirical implications of the decision still have real-world consequences. A judge’s ignorance of causes might make him or her ignorant of the consequences of a particular decision, but the consequences still occur. Hence, for example, if research indicates a high false positive rate for predictions of violence in the civil commitment of sexually violent predators, ignoring this research, as the Court has done,⁴³ does not alter the fact that many people are wrongly deprived of their liberty.

Although the task for judges appears daunting, it is not as difficult as it might first appear. First of all, most of the research that is introduced in constitutional cases is not rocket science. An elementary understanding of basic statistics and research methods will suffice in many cases to reveal the benefits and limitations associated with much of the research

⁴¹ See generally David L. Faigman, *Judges as “Amateur Scientists,”* 86 B.U. L. REV. 1207 (2006).

⁴² Brief of American Psychological Ass’n, and the Missouri Psychological Ass’n as Amici Curiae Supporting Respondents at 4-12, *Roper*, 543 U.S. 551 (2005) (No. 03-633), 2004 WL 1636447.

⁴³ David L. Faigman, *Making Moral Judgments Through Behavioural Science: The “Substantial Lack of Volitional Control” Requirement in Civil Commitments*, 2 LAW, PROBABILITY & RISK 309 (2003).

courts must consider. Second, especially in high profile constitutional cases, the Court will have considerable help in understanding the state of the art of the science. The Court suffers no shortage of amici when it comes to answering empirical questions about issues such as the onset of viability,⁴⁴ whether a health exception is necessary to a ban on partial birth abortions,⁴⁵ the developmental capacities of juveniles,⁴⁶ the effects of physician-assisted suicide,⁴⁷ the effects of virtual child pornography,⁴⁸ and similar factual questions. Finally, although the Court is reluctant to employ this aid, all courts have the inherent authority to appoint experts to assist them with complex technical subjects.⁴⁹

4. Determining the Contents of Conclusions

A pervasive and troubling concern present in all scientific research, but particularly in the social sphere, is the danger that researchers will graft their values onto their conclusions.⁵⁰ It may be assumed that, in many cases, what initially attracts researchers to legal problems is the hope to reform legal rules they view as “substantively” wrong. In researching the factual context of a legal rule with which social scientists disagree, they may unwittingly (or wittingly) interpret their data as more supportive of a particular normative position than the data actually compel. Although natural scientists share this source of difficulty, they do so to a lesser degree because a natural scientist’s inquiry tends to be less inherently value-laden.⁵¹ Although it may be impossible to completely eradicate a researcher’s hopes and fears from coloring his or her conclusions, these prejudices are not fatal to

⁴⁴ See *Roe v. Wade*, 410 U.S. 113 (1973).

⁴⁵ See *Gonzales v. Carhart*, 127 S. Ct. 1610 (2007).

⁴⁶ See *Roper v. Simmons*, 543 U.S. 551 (2005).

⁴⁷ See *Washington v. Glucksberg*, 521 U.S. 702 (1997); see also *infra* notes 88-104 and accompanying text.

⁴⁸ See *Aschcroft v. ACLU*, 535 U.S. 564 (2002).

⁴⁹ See DAVID L. FAIGMAN, *LABORATORY OF JUSTICE: THE SUPREME COURT’S 200-YEAR STRUGGLE TO INTEGRATE SCIENCE AND THE LAW* 360 (2004) (reporting interviews with Justices Stevens, O’Connor, and Breyer, who commented on “how unusual” the Court’s appointment of a technical adviser would be).

⁵⁰ NAGEL, *supra* note 15, at 488-89; see also John Passmore, *Can the Social Sciences Be Value-Free?*, in *READINGS IN THE PHILOSOPHY OF SCIENCE* 674 (H. Feigl & M. Brodbeck eds., 1953).

⁵¹ All scientists, whether natural or social, whose work potentially impacts public policy formation confront this issue. See, e.g., Jocelyn Kaiser, *Taking a Stand: Ecologists on a Mission to Save the World*, 287 *SCIENCE* 1188 (2000).

scientific social inquiry. At the science and law intersection, lawyers and social scientists share the burden of identifying and reducing the bias from research findings.

For their part, researchers must be forthcoming, possibly by stating explicitly their substantive biases entirely separately from their scientific findings.⁵² Of course, such a practice will never be totally effective because many value preferences are not fully known to the scientist, or their effect on the analysis is not fully understood.⁵³ Nonetheless, a greater recognition of the problem will likely mitigate its effect. Additionally, social scientists should display more modesty when evaluating the significance of their findings. Sometimes researchers exude the confidence in their conclusions that their one study has settled the matter for the law. Rarely, if ever, is one study so conclusive that a legal rule can rest solely upon it.⁵⁴

Lawyers must also take responsibility for identifying bias where it occurs in empirical research. This means that lawyers must understand more than the conclusions advanced; they must also consider how the findings were obtained. For this purpose, the most important section for lawyers to read and understand in a scientific paper is the methods section. There, the researcher explains the design of the study, describes the sample population, defines—concretely (that is, operationally)—the question addressed, and describes the statistics used to measure subjects' responses. The worth, or worthlessness, of a study can almost always be discerned from the methods section. Only if one understands how the study was conducted can one evaluate the soundness of the researcher's conclusions.

The ability of readers of the scientific literature to identify errors due to extraneous factors should not be overstated, because some errant variables will not be observable in the methods, or any other, section. A multitude of unanticipated factors could influence the findings of a particular study or series of studies. But in the long-term, the ordinary checks inherent in the scientific enterprise can be relied upon to expose the biases, unconscious or conscious, of the researchers.

⁵² NAGEL, *supra* note 15, at 489.

⁵³ *Id.*

⁵⁴ See Michael J. Mahoney, *Experimental Methods and Outcome Evaluation*, 46 J. CONSULTING & CLINICAL PSYCHOL. 660, 660 (1978) ("The perfect experiment has yet to be designed and is, in some sense, inconceivable." (citation omitted)).

Professor Nagel explained the dynamics of this system as follows:

[M]odern science encourages the invention, the mutual exchange, and the free but responsible criticisms of ideas; it welcomes competition in the quest for knowledge between independent investigators, even when their intellectual orientations are different; and it progressively diminishes the effects of bias by retaining only those proposed conclusions of its inquiries that survive critical examination by an indefinitely large community of students, whatever be their value preferences or doctrinal commitments.⁵⁵

The conclusion that value biases influence the lessons researchers draw from their data is less surprising than the suggestion that lawmakers can be so easily misled by that bias. The methods and conclusions of social science research are like the premises and conclusions of legal argument: the validity of the premises must be determined in order to assess the soundness of the conclusions that the premises purportedly compel. Just as no good lawyer would accept a legal conclusion without examining the validity of the premises, no good lawmaker should accept research findings without examining how they were obtained.

5. Dividing Fact from Value

A fundamental criticism of scientific social inquiry concerns the assertion that fact and value are distinguishable in social inquiry. Critics argue that in studying purposive human behavior, value judgments invariably become intertwined with the descriptions of that behavior.⁵⁶ Specifically, in the ordinary course of describing and categorizing events, social scientists cannot help but make evaluative judgments. The alternative of describing discrete factual events would be cumbersome, simplistic, and probably misleading. An arguable instance of this criticism is the psychological study of children's competence, an issue discussed above. It might be argued that an unavoidable consequence of studying competence is the

⁵⁵ NAGEL, *supra* note 15, at 489-90; see generally DAVID L. HULL, *SCIENCE AS A PROCESS: AN EVOLUTIONARY ACCOUNT OF THE SOCIAL AND CONCEPTUAL DEVELOPMENT OF SCIENCE* (1988).

⁵⁶ See Fineman & Opie, *supra* note 14, at 130 ("The data can never be totally separated from the political, personal, and professional opinions of the person manipulating them."); William C. Whitford, *Critical Empiricism*, 14 LAW & SOC. INQUIRY 61, 62 (1989) (asserting the impossibility of fully separating description from evaluation); see also Howard T. Markey, *Jurisprudence or "Juriscience"?*, 25 WM. & MARY L. REV. 525, 529 (1984).

inevitable value judgment required by that categorization. This criticism, however, misconstrues the evaluative role of social scientific inquiry.

Without denying that many researchers blur factual judgments and value judgments in the course of scientific inquiry, in principle these judgments can be kept distinct. Professor Nagel noted that confusion often arises from the failure to distinguish between “characterizing value judgments” and “appraising value judgments.”⁵⁷ He provided the following example of a characterizing value judgment from biology:

Animals with blood streams sometimes exhibit the condition known as “anemia.” An anemic animal has a reduced number of red blood corpuscles, so that, among other things, it is less able to maintain a constant internal temperature than are members of its species with a “normal” supply of such blood cells. However, although the meaning of the term “anemia” can be made quite clear, it is not in fact defined with complete precision. . . . [T]o decide whether a given animal is anemic, an investigator must judge whether the available evidence *warrants* the conclusion that the specimen is anemic. . . . When the investigator reaches a conclusion, he can therefore be said to be making a “value judgment,” in the sense that he has in mind some standardized type of physiological condition designated as “anemia” and he assesses what he knows about his specimen with the measure provided by this assumed standard.⁵⁸

In addition to the assessment that the animal is anemic, a biologist might assert that this condition is undesirable because of the animal’s inability to maintain itself. Professor Nagel referred to such expressions of approval or disapproval as “appraising value judgments.”⁵⁹ To be sure, at times the terminology of social inquiry make fact/value distinctions difficult, with characterizing value judgments often implying appraising value judgments. But this point counsels caution. It does not contravene the capacity of social scientists to make the distinction.

By distinguishing characterizing value judgments from appraising value judgments, one can understand the factual nature of social scientific inquiry into children’s competence. For example, psychologists interested in children’s competence have gleaned certain characteristics from case law associated

⁵⁷ NAGEL, *supra* note 15, at 493.

⁵⁸ *Id.* at 492-93 (emphasis in original).

⁵⁹ *Id.* at 493.

with various areas of legal competence.⁶⁰ In studying this question, researchers typically compare children of different ages to adults (who are presumed competent by the law) on these factors.⁶¹ Subsequent characterizations of certain children as competent is analogous to the biologist's characterizations concerning anemia in animals. The researcher classifies the subject group either within or outside the category of competence based on the identified characterizing criteria. Whether the psychological measure of competence adequately meets the legal conception of competence, therefore, remains challengeable separately in the same way that the factors characterizing anemia may be challenged. But in no respect does the characterizing value judgment that children of a certain age are "competent" entail a corresponding appraising value judgment.

In fact, psychological studies that find children as young as fifteen comparable to adults in their competency to make important decisions may be cited to support widely divergent legal conclusions. Whereas this research may support children's participation in decisions of commitment to mental hospitals⁶² and autonomous abortion decisions,⁶³ it may also support juveniles' waivers of *Miranda* rights.⁶⁴ Indeed, children's competencies was a hotly disputed issue in *Roper v. Simmons*, in which Justice Kennedy cited social science research in support of exempting minors from capital punishment, while Justice Scalia, dissenting, decried the disingenuity of social scientists who proclaimed minors' capacities in abortion cases but disavowed those capacities in capital cases.⁶⁵ Although the cognitive ability of children is a

⁶⁰ See, e.g., GRISIO, *supra* note 39, at 41-58.

⁶¹ See, e.g., *id.* at 95-97; Weithorn & Campbell, *supra* note 39, at 1591.

⁶² See Weithorn & Campbell, *supra* note 39, at 1596.

⁶³ See Gary B. Melton & Anita J. Pliner, *Adolescent Abortion: A Psychological Analysis*, in ADOLESCENT ABORTION: PSYCHOLOGICAL AND LEGAL ISSUES 5 (G. Melton ed. 1986).

⁶⁴ GRISIO, *supra* note 39, at 194 (noting research finding that juveniles between the ages of 15 and 16 with I.Q. scores above 80 "demonstrate[] a level of understanding and perception similar to that of 17- to 21-year-old adults for whom the competence to waive rights is presumed in law.").

⁶⁵ Compare *Roper v. Simmons*, 543 U.S. 551, 569 (2005) ("Three general differences between juveniles under 18 and adults demonstrate that juvenile offenders cannot with reliability be classified among the worst offenders.") with *Roper v. Simmons*, 543 U.S. 551, 616-17 (2005) (Scalia, J., dissenting) ("[T]he American Psychological Association (APA), which claims in this case that scientific evidence shows persons under 18 lack the ability to take moral responsibility for their decisions, has previously taken precisely the opposite position before this very Court."). See

scientific question, the legal consequences that befall competent and incompetent children remain policy choices. Psychologists and economists may be able to identify some of the consequences of choosing one course over another, but they can never offer scientific judgments on what effects are better avoided. Therefore, a court may continue to hold that fifteen-year-old children should not be consulted when committed to mental hospitals, even though they generally may be as competent to make important decisions as adults. This result can be justified by a concern for family autonomy⁶⁶ or a recognition of competing parental rights.⁶⁷ When confronted by conflicting value choices, courts must exercise their best judgment in light of all of the information available. Where relevant and valid, social science research can help clarify the available choices.

6. Assessing the Evidence

In addition to accusations that a researcher's values affect her conclusions, critics claim that bias may enter into the very assessment of data.⁶⁸ There are at least three distinct variants of this claim: First, a researcher's social position and educational training influence the kinds of evidence deemed important. Second, the statistical decision rules employed by researchers mask important value choices.⁶⁹ And third, a researcher's relative "social perspective" impedes attempts to identify "universal" principles.⁷⁰

Whether a researcher's social status affects the kinds of evidence he or she deems relevant to social inquiry is an empirical question.⁷¹ Some support may be expected for the assertion that a researcher's socioeconomic, religious, and political views play some part in the assessment of data. But, as the previous discussion indicates, manifestations of such bias are recognizable by careful review of the measures applied

generally Joseph L. Hoffmann, *On the Perils of Line-Drawing: Juveniles and the Death Penalty*, 40 HASTINGS L.J. 229 (1989).

⁶⁶ See *Parham v. J.R.*, 442 U.S. 584, 598-604 (1979).

⁶⁷ See *Planned Parenthood of Cent. Mo. v. Danforth*, 428 U.S. 52, 73 (1976).

⁶⁸ See NAGEL, *supra* note 15, at 495.

⁶⁹ See generally Rudner, *The Scientist Qua Scientist Makes Value Judgments*, in *INTRODUCTORY READINGS IN THE PHILOSOPHY OF SCIENCE* 492 (E.D. Klemke et al. eds., 3d ed. 1998).

⁷⁰ NAGEL, *supra* note 15, at 498-99.

⁷¹ *Id.* at 495-96.

in the research. Once prejudice is identified, a study's findings may be discounted or dismissed accordingly.

A more technical objection to the problem of assessing evidence concerns the statistical rules that researchers use to decide if any effect has occurred. When comparing sample populations in order to determine whether some variable had an effect, two types of error are possible. A researcher may conclude that the factor of interest did have an effect when it did not (type I error, or "false positive"); or the researcher may conclude that the factor of interest had no effect when it did (type II error, or "false negative"). Social scientists are well acquainted with these sources of error and have devised various strategies to avoid them. The present criticism, however, is directed not at the possibility of error, but instead at the values employed when deciding to avoid one error at the expense of possibly committing the other.

Consider, for example, a group of hypothetical researchers who are interested in whether the death penalty is a deterrent. Hypothesizing that capital punishment lowers murder rates, they might compare states with capital punishment to a comparison group of states that do not. Upon comparison, the researchers find different murder rates between the two groups, but must decide whether they are "significant" enough to conclude that the death penalty made the difference; after all, some differences should be expected as a matter of chance. In assessing the data, the researchers must be cognizant of the possibility of committing one of the two types of error mentioned above. If they make a type I error, they will erroneously conclude that the death penalty had a deterrent effect when it did not. Alternatively, they might make a type II error, erroneously concluding that the death penalty had no deterrent effect when it did. Unfortunately, the researchers cannot eliminate or fully minimize the chance of making both types of error at the same time, and therefore must decide which error is more important to avoid. It appears, therefore, that researchers cannot avoid importing their values into the assessment of data.

Although this example illustrates a valid source of concern, the magnitude of the problem is not as great as it might first appear. Within the social sciences, certain conventions have arisen that minimize an experimenter's independent judgment regarding drawing statistical conclusions from data. In particular, the much discussed convention of a .05 confidence level restricts researchers to the relatively conservative

risk of a five percent chance of making a type I error. Specifically, in the example above, this means that the researchers will mistakenly conclude that the death penalty has a deterrent effect five or fewer times out of a hundred if the death penalty is not a deterrent.⁷² On some occasions, researchers might wish to lessen the risk of making a type I error by adopting a more conservative level of confidence, say one out of one hundred (.01). Similarly, less concern with making a type I error may lead a researcher to adopt a less conservative level of confidence, possibly ten out of one hundred (.10). Without question, scientists' value preferences can affect the setting of confidence levels in a way that makes drawing a particular conclusion more or less difficult. Ideally, these judgments should be the responsibility of lawmakers. In any case, the standard selected should always be made explicit so that readers understand the decision rule the scientist applied in stating the conclusion. Departures from .05, and indeed even the decision to use a value of .05, should be scrutinized independently by anyone relying on a researcher's findings. Once again, the important lesson is that a review of a researcher's methodological discretion illuminates biases potentially affecting the reported findings.

The third and most "radical" claim that values influence the assessment of data maintains that a "necessary logical connection" exists between the researcher's social perspective and the method and understanding of what is studied, rendering lessons from one time or place of no relevance to another time or place. Knowledge of societal or cultural facts, according to this view, is context specific. Therefore, the factual validity of a social finding can only be understood by knowing the society from which it emerged. As Professor Nagel explained the criticism, "there is no analysis of social phenomena which is not the expression of some special social standpoint, or which does not reflect the interests and values dominant in some sector of the human scene at a certain stage of its history."⁷³

Although the claim typically excludes the natural sciences from its critical gaze, natural scientists also must state conclusions in a manner dependent on context. For instance, simply measuring the velocity of a stone dropped

⁷² Put succinctly, the p-value is the probability of incorrectly rejecting the null hypothesis when the null hypothesis is true.

⁷³ NAGEL, *supra* note 15, at 498.

from a fixed point requires specification of the system of measurement used as well as a statement of the experimental conditions under which the measurement is taken. The situational dependence of this example is complicated further by adding the perspective of the observer. Albert Einstein provided the paradigmatic illustration of this complication:

I stand at the window of a railway carriage which is traveling uniformly, and drop a stone on the embankment, without throwing it. Then, disregarding the influence of the air resistance, I see the stone descend in a straight line. A pedestrian who observes the misdeed from the footpath notices that the stone falls to earth in a parabolic curve. I now ask: Do the "positions" traversed by the stone lie "in reality" on a straight line or on a parabola?⁷⁴

Absolute objectivity, it would seem, is unattainable even in natural science. There is thus no "God's-eye-view" of the world that is discoverable by science, at least not without specifying the mountaintop on which He stands. Yet, substantial objectivity, or what Professor Nagel refers to as "relational objectivity," is achieved when natural scientists identify invariant connections between factors. As a matter of logic, natural science can, and often does, identify relations which are demonstrable within the specifications established by experiment and which transcend particular value orientations or social perspectives.

The social sciences also operate in relationally specific contexts. To the extent that objectivity in the natural sciences depends on identifying and then transcending specific relational contexts, the social sciences, in principle, can do the same. Even though two sets of experimental results may be the product of separate social perspectives or value orientations, additional research may seek out "common denominators" from which results may be formulated, irrespective of the researcher's initial perspectives.⁷⁵ The complaint that the new synthesis suffers from a similar perspective-myopia can be admitted, though it is hardly the fatal flaw social science's critics suppose. The goal for social science, as well as natural science, is relative objectivity, not absolute objectivity.

A researcher's values and social perspective inevitably intrude into the identification of problems, the analysis of data,

⁷⁴ ALBERT EINSTEIN, *RELATIVITY; THE SPECIAL AND THE GENERAL THEORY* 9 (Robert W. Lawson trans., Holt 1920).

⁷⁵ NAGEL, *supra* note 15, at 501.

and the conclusions drawn from the inquiry into social facts. Adhering to the scientific method in such studies perhaps provides only a limited, and not entirely satisfying, check on the interference of researchers' biases. But, however imperfect the process might be, the benefits of a scientific social inquiry are worth the effort.

B. Amalgamation of Facts and Norms in Constitutional Doctrine

In addition to the complicating reality that research on social facts can be imbued with value preferences, courts and scholars regularly conflate facts and values in constitutional discourse. This is so in respect to both the language of the Constitution itself and the rules and standards that give the Constitution effect. The Constitution, for example, guarantees the people the right to peaceably assemble and to be secure against unreasonable searches and seizures. But what conduct passes as peaceable and what actions are unreasonable are not specified, though assemblages and searches and seizures are easily enough imagined empirically. In applying the necessarily imprecise words of the Constitution, the Court also regularly fashions tests that are composites of fact and value. The Constitution, for instance, limits congressional power to regulate commerce to "interstate commerce." In one application of this doctrine, the Court asks whether the subject of regulation "substantially affects interstate commerce." When the substantiality threshold has been crossed is a value judgment that, surprisingly, has garnered little serious scholarly attention.

In constitutional cases, therefore, the line dividing law and fact is not a bright one. Indeed, it is so dim that courts and commentators regularly fail to notice it. As a consequence, normative and empirical arguments in constitutional litigation tend to meld into one another and clarity is the primary victim. For instance, *Casey's* undue burden standard, mentioned above, is explicitly contemplated as an empirically conscious test of the constitutionality of pre-viability abortion regulations. Yet in neither the case itself nor in subsequent case law has the Court adequately defined the normative component represented by the term "undue" or the empirical component represented by the term "burden." Instead, the undue burden

standard, in practice, is ill-defined both normatively and empirically.⁷⁶

In constitutional litigation, as is the case in most litigation, the division of responsibility between judge and trier of fact (jury or judge) is allocated on the basis of the nature of the issue presented. Matters of pure law are the exclusive responsibility of judges and matters of pure fact are resolved by triers of fact. The third category, and the one in which most constitutional facts fall, are mixed questions of fact and law. In ordinary litigation, these categories tend to define the line between judge and jury. In constitutional cases, in contrast, judges often—albeit not always—act in the dual capacity of determiner of law and finder of fact. Nonetheless, for a variety of reasons, the categories of pure law, pure fact, and mixed questions of fact and law, are an important component of constitutional adjudication.

Questions of pure law involve the interpretation of the Constitution and the setting forth of doctrine. In practice, purely legal questions thus concern the definition of the rules and standards that are applied in constitutional adjudication. Examples range from whether “fighting words” sometimes qualify as “speech” within the First Amendment⁷⁷ to whether congressional actions must “affect” or “substantially affect” interstate commerce.⁷⁸ In the *Casey* example from above, it was a purely legal question whether the Fourteenth Amendment’s protection of reproductive liberty should be implemented pursuant to the “undue burden” standard or the more traditional strict scrutiny test. This issue is reserved exclusively for judges to decide. This category of purely legal questions, therefore, encompasses all matters of doctrinal definition. It is under this doctrinal edifice that pure facts and mixed questions of fact and law are ultimately decided.

In non-constitutional cases, “case-specific facts” (also known as “pure facts” or “historical facts”)⁷⁹ fuel the engine of

⁷⁶ See, e.g., *Gonzales v. Carhart*, 127 S. Ct. 1610 (2007); *Stenberg v. Carhart*, 530 U.S. 914 (2000).

⁷⁷ Compare *R.A.V. v. City of St. Paul*, 505 U.S. 377, 387-88 (1992) (finding that “content-based” regulation of fighting words violated the First Amendment), with *Chaplinsky v. New Hampshire*, 315 U.S. 568, 573 (1942) (holding that prohibition against “classical fighting words” fell outside the bounds of constitutional protection).

⁷⁸ See *United States v. Lopez*, 514 U.S. 549 (1995) (criticizing earlier Commerce Clause cases for failing to impose substantiality requirement to applicable test).

⁷⁹ If forced to choose between these two terms, I prefer “pure facts,” though like the term “truth,” it promises more than it can possibly deliver. In constitutional

litigation. Such facts play a more modest role in constitutional cases. Indeed, although case-specific facts occur throughout constitutional law, they typically must be digested by applicable doctrine and come to be treated as mixed questions of fact and law. For example, in *Scott v. Harris*, the plaintiff-motorist claimed that the defendant police officer acted unreasonably and violated his Fourth Amendment rights when the officer forced the motorist off the road during a high-speed chase.⁸⁰ As the Court explained, the circumstances of the car chase raised factual issues that had to be resolved in light of the evidence available and pursuant to ordinary rules of procedure.⁸¹ Once these case-specific facts were determined, the question whether the officer acted in an objectively reasonable fashion became a legal question. The process of evaluating the facts against the applicable legal standard is designated as a mixed question of law and fact. According to the Court, “[i]n determining the reasonableness of the manner in which a seizure is effected, [w]e must balance the nature and quality of the intrusion in the individual’s Fourth Amendment interests against the importance of the governmental interests alleged to justify the intrusion.”⁸²

As a practical matter, therefore, although case-specific facts can be readily identified in constitutional cases, they virtually always must be evaluated under some constitutional rule of decision. Whether this or that fact is constitutionally protected or unprotected is a legal question. In *Scott*, for instance, the plaintiff-motorist argued that the constitutionality of the officer’s action in forcing him off the road during a high-speed car chase should have been controlled by the outcome in *Tennessee v. Garner*.⁸³ In *Garner*, the Court found that an officer had used excessive force when he shot a fleeing unarmed burglary suspect in the back of the head.⁸⁴ The constitutional issue presented in *Scott* and *Garner* was the

cases, the term “historical facts” is confusing, since judges often look to history (i.e., original intent) to answer questions of pure law and mixed questions of law and fact. I use the term “case-specific facts” to avoid this confusion. Case-specific facts refer to the who, why, where, what, and how of some event or occurrence having constitutional import.

⁸⁰ 127 S. Ct. 1769, 1773 (2007).

⁸¹ In *Scott*, the plaintiff had lost at summary judgment, so the relevant facts had to be determined with “all inferences in favor of the nonmoving party to the extent supportable by the record.” *Id.* at 1776 (emphasis omitted).

⁸² *Id.* at 1778 (quoting *United States v. Place*, 462 U.S. 696, 703 (1983)).

⁸³ *Id.* at 1777; see generally *Tennessee v. Garner*, 471 U.S. 1 (1985).

⁸⁴ *Garner*, 471 U.S. at 21.

same. Given the facts presented,⁸⁵ did the police act in an objectively reasonable way? The *Scott* Court concluded, however, that the same rule-of-decision dictated different outcomes. The Court stated that “the threat posed by the flight on foot of an unarmed suspect [was not] even remotely comparable to the extreme danger to human life posed by [the fleeing motorist] in this case.”⁸⁶

As *Scott* illustrates, ordinary case-specific facts can be incorporated into constitutional lawmaking through the decisional rules established pursuant to the Constitution. Hence, the plain facts of the car chase were evaluated under the normative reasonableness standard contained in the Fourth Amendment. But constitutional facts are rarely as plain or unambiguous as *Scott*’s car chase, which was captured on video. Indeed, most facts having constitutional relevance are not simple case-specific facts, like *Scott*’s car chase, but instead are complex scientific or general historical facts, like viability or the intentions of the drafters of the Fourteenth Amendment or the effects of violent television on young viewers.

Although they might be the subject of numerous and intricate scientific studies, facts such as “viability” or the “effects of violent television” can still be identified separately and then integrated into constitutional lawmaking.⁸⁷ Consider, as a case study, the complex empirical issues surrounding physician-assisted suicide that were presented in *Washington v. Glucksberg*.⁸⁸ The plaintiffs in *Glucksberg* claimed that a person who is terminally ill and mentally competent should have the right to choose what form his or her death would take, and have the right to a physician’s assistance in exercising that right.⁸⁹ The plaintiffs claimed that the Fourteenth Amendment’s Due Process Clause extended to “the liberty to choose

⁸⁵ The division of the issue into “pure facts” and the legal resolution of those facts raises the question of the respective responsibilities between trier of fact and judge as a practical matter. Space precludes consideration of this issue in the essay.

⁸⁶ *Scott*, 127 S. Ct. at 1777.

⁸⁷ The complexities surrounding historical facts, such as the original intentions of the drafters of the Second Amendment, are beyond the scope of this essay. As a general matter, however, the methods of historical exploration are sufficiently similar to the methods many social scientists use in that most of the lessons drawn here regarding science and scientists should apply to history and historians as well. See HAACK, *supra* note 5, at 24 (comparing the methods of science to “what historians or detectives or investigative journalists or the rest of us do when we really want to find something out”).

⁸⁸ 521 U.S. 702 (1997).

⁸⁹ *Id.* at 722.

how to die,” or “the right to choose a humane, dignified death.”⁹⁰ The Court, however, with Chief Justice Rehnquist writing, defined the asserted right as the “right to commit suicide which itself includes a right to assistance in doing so.”⁹¹

It is, of course, a basic principle of hornbook law that the existence or non-existence of a fundamental right ordinarily dictates the level of judicial review that is accorded a disputed state action. Hence, if the plaintiffs’ view prevailed, so that the right to physician-assisted death was deemed a fundamental right, the state would be obligated to justify infringements or limitations of the exercise of that right by demonstrating that its action was narrowly tailored to advance a compelling government interest. If the right was deemed a liberty interest but not fundamental, the state’s burden would be substantially lighter, and would require only that the action was rationally related to a legitimate government interest. The Court had little difficulty in finding that the right, given its definition as the right to commit suicide, was not fundamental. “[F]or over 700 years,” Rehnquist explained, “the Anglo-American common law tradition has punished or otherwise disapproved of both suicide and assisting suicide.”⁹² Under the Court’s interpretation, therefore, the state did not have to advance and prove a strong justification for its prohibition of assisted suicide. But the legal posture of *Glucksberg* turns out to be more complicated, as the concurring opinions of Justices Stevens and Souter make clear.

Justice Stevens wrote separately to emphasize that the Court’s holding did not preclude later protection of a terminally ill patient’s right to assistance in hastening death. The Court, he stated, merely found that the Washington statute prohibiting suicide was not invalid “on its face.”⁹³ The Court’s decision “does not foreclose the possibility that some applications of the statute might well be invalid.”⁹⁴ In particular, Stevens contemplated a case in which a mentally competent person who is terminally ill and suffering excruciating pain seeks a physician’s help to facilitate the end. “The liberty interest at stake in a case like this,” Stevens said, “is an interest in

⁹⁰ *Id.* at 703.

⁹¹ *Id.* at 723.

⁹² *Id.* at 711.

⁹³ *Id.* at 739 (Stevens, J., concurring).

⁹⁴ *Id.*

deciding how, rather than whether, a critical threshold shall be crossed.”⁹⁵

Justice Souter also wrote separately to point out that *Glucksberg* sits atop a constitutional fault-line that might shift as our understanding of the empirical landscape changes. Souter sought to reconcile Rehnquist’s majority opinion finding no right to assisted suicide and Stevens’s presaging the next case down the line, which presents the sympathetic situation of the competent terminally ill patient in debilitating pain who wants to choose a dignified end to a dignified life. Souter wrote that the core concern in these cases was fact-based.

Souter asserted that the state has no interest in denying a competent terminally ill patient in debilitating pain his or her choice of how to die. According to Souter, the state’s legitimate interest lies in averting mistakes, in precluding assisted suicide from becoming directed suicide. The state thus rationally fears the slippery slope that once a procedure is set in place that permits some to freely choose death, others will be encouraged or even forced into this choice. “The nub of this part of the State’s argument is not that such patients are constitutionally undeserving of relief on their own account, but that any attempt to confine a right of physician assistance to the circumstances presented by these doctors is likely to fail.”⁹⁶

Whether the state is correct that compassionate assistance in dying ineluctably leads to involuntary euthanasia is an empirical question. In the majority opinion, Chief Justice Rehnquist cited and discussed at length a study from the Netherlands designed to test this hypothesis. According to Rehnquist, the 1990 Dutch study reported “2,300 cases of voluntary euthanasia (defined as ‘the deliberate termination of another’s life at his request’), 400 cases of assisted suicide, and more than 1,000 cases of euthanasia without an explicit request.”⁹⁷ More profoundly disturbing, Rehnquist reported that, in addition to those 1,000 cases, “the study found an additional 4,941 cases where physicians administered lethal morphine overdoses without the patients’ explicit consent.”⁹⁸ Rehnquist concluded that the Dutch study

⁹⁵ *Glucksberg*, 521 U.S. at 745.

⁹⁶ *Id.* at 754 (Souter, J., concurring).

⁹⁷ *Id.* at 734 (majority opinion).

⁹⁸ *Id.*

suggests that, despite the existence of various reporting procedures, euthanasia in the Netherlands has not been limited to competent, terminally ill adults who are enduring physical suffering, and that regulation of the practice may not have prevented abuses in cases involving vulnerable persons, including severely disabled neonates and elderly persons suffering from dementia.⁹⁹

Justice Souter, however, found the empirical record more mixed. On the one hand, some commentators found that Dutch guidelines have “proved signally ineffectual; non-voluntary euthanasia is now widely practised and increasingly condoned in the Netherlands.”¹⁰⁰ On the other hand, some researchers have found the opposite, that “Dutch physicians are not euthanasia enthusiasts and they are slow to practice it in individual cases.”¹⁰¹ Souter concluded that he could not say with any “assurance which side is right.”¹⁰²

Ordinarily, when the fact of the matter is uncertain, procedural burdens of proof allocate the risks of error and guide decision making. Standards of proof should be based on underlying normative considerations associated with the costs of making a mistake. This is why the burden of proof in civil cases is the preponderance standard, but is beyond a reasonable doubt in criminal cases. In constitutional cases, such allocation ought to depend on the constitutional values found to be implicit in the text. In *Glucksberg*, this issue depended on the Court’s interpretation of the due process clause. The main area of focus, as set forth in the Stevens and Souter opinions, was whether the due process clause might extend protection to a competent, terminally ill patient, who was in debilitating pain. According to Stevens, “[a]voiding intolerable pain and the indignity of living one’s final days incapacitated and in agony is certainly ‘at the heart of [the] liberty . . . to define one’s own concept of existence, of meaning, of the universe, and the mystery of human life.’”¹⁰³ If Stevens’s position is correct, then the state should have the burden to demonstrate that procedural protections cannot be enacted to

⁹⁹ *Id.*

¹⁰⁰ *Id.* at 786 (Souter, J., concurring) (internal quotation marks omitted) (citing and quoting John Keown, *Euthanasia in the Netherlands: Sliding Down the Slippery Slope?*, in *EUTHANASIA EXAMINED* 261, 289 (John Keown ed., 1995)).

¹⁰¹ *Id.* (internal quotation marks omitted) (citing and quoting RICHARD A. EPSTEIN, *MORTAL PERIL: OUR INALIENABLE RIGHT TO HEALTH CARE?* 322 (1997)).

¹⁰² *Id.*

¹⁰³ *Id.* at 745 (1997) (Stevens, J., concurring) (alterations in original) (citing and quoting *Planned Parenthood of Se. Pa. v. Casey*, 505 U.S. 833, 851 (1992)).

avoid involuntary euthanasia if it seeks to entirely proscribe assisted suicide for the terminally ill, competent patient suffering intolerable pain. Accordingly, the Constitution would guarantee the right of physician-assisted suicide in a select group of cases until states adequately demonstrated that procedural mechanisms were unavailable to avoid the slide into involuntary euthanasia.

Oddly, Justice Souter failed to follow this basic logic when he reached the issue of how the empirical question might be resolved in future cases. According to him, the Court's decision regarding whether the right to die is constitutionally based should await state experimentation to determine whether there is a workable stopping point between assisted suicide and involuntary euthanasia. He stated that the Court should "stay its hand" until the state legislatures had ample opportunity to study the question. But Souter essentially put the horse behind the cart. The existence of a constitutional right to assisted suicide should not depend on whether procedural protections can be constructed to avoid having the right to die turn into the duty to die. This factual issue, the subject of the Dutch research and Souter's hoped-for subject of future American research, concerns the government's interest in curtailing the claimed right to die. The fundamental right to autonomy over death, if it exists, exists separately from the state's claimed reasons for regulating or prohibiting it.¹⁰⁴

By analogy, states have often sought to regulate violent pornography on the basis that it makes consumers of it more prone to be violent.¹⁰⁵ Violent pornography falls within the protection of the First Amendment's guarantee of free speech. This means that violent pornography cannot be prohibited until the state demonstrates empirically that it causes violence. Thus, the right is protected first, and government claims of compelling reasons to permit regulation of it must be proved—a demand that might take considerable time and effort on the

¹⁰⁴ This practice of using a state's asserted justification for infringing a right as a basis for finding that no right exists in the first instance is not unique to Justice Souter. It can be found throughout the Court's cases. See Lawrence H. Tribe and Michael C. Dorf, *Levels of Generality in the Definition of Rights*, 57 U. CHI. L. REV. 1057, 1096-97 (1990). Its frequency, however, does not render it legitimate. See David L. Faigman, *Reconciling Individual Rights and Government Interests: Madisonian Principles Versus Supreme Court Practice*, 78 VA. L. REV. 1521, 1539 (1992).

¹⁰⁵ See, e.g., *Am. Booksellers Ass'n, Inc. v. Hudnut*, 771 F.2d 323 (7th Cir. 1985) (invalidating Indiana's anti-pornography statute, which, among other things, proscribed violent pornography).

part of legislatures. Contrary to Souter's argument, this has not interfered with public officials studying the issue of the effects of violent pornography and, indeed, this topic has been the subject of substantial research attention as well as two presidential commissions.¹⁰⁶ In fact, placing the burden on legislatures is likely to produce more research, not less, since states need to generate evidence to justify their legislation. Hence, the free speech right exists and continues to be protected until legislatures develop sufficient proof to demonstrate a compelling interest to justify infringements of that right. There is no reason why exactly the same sort of analysis should not apply to assisted dying.

Recognizing that the Constitution evolves as society—and, more particularly, our factual understanding of society—changes does not make the Constitution any less “durable” than Souter's institutional deference to legislatures in *Glucksberg* would make it. In his universe, the Constitution “changes” if the legislative answer is that procedural protections can be instituted to ensure that assisted dying does not become forced euthanasia. At that point in time, the *Glucksberg* ruling would have to be “amended” to permit the right to die so long as it is accompanied by whatever procedural protections the states come up with to prevent involuntary euthanasia. In the alternative, the Constitution “changes” if assisted dying is protected today, but legislatures demonstrate tomorrow that procedural controls are ineffective. States would have demonstrated that they have a compelling interest in prohibiting all assisted suicides, because the practice cannot be limited to the small group in which it is appropriate. The only question is what is to be the default position. In the absence of sound empirical research one way or the other, does assisted suicide receive constitutional protection or does it not? The empirical question of the availability of procedural controls adequate to avoid involuntary euthanasia must be evaluated in light of the answer to this question. This is a matter of constitutional interpretation. Science cannot say what the Constitution means, but it can provide a window into the world so that constitutional values can be justly applied. Science thus informs the constitutional analysis.

¹⁰⁶ See generally ATTORNEY GENERAL'S COMMISSION ON PORNOGRAPHY: FINAL REPORT (1986); THE REPORT OF THE COMMISSION ON OBSCENITY AND PORNOGRAPHY (1970).

In the example of physician-assisted suicide, science should play a pivotal role in deciding actual cases. But it does not displace classic constitutional value definition. Indeed, it should clarify it. This issue presents an archetypal clash of irreconcilable principles. On the one hand, the state declares an abiding and weighty interest in protecting life, including especially the weak and vulnerable who might be hastened toward death in a general scheme permitting assisted suicide. On the other hand, due process guarantees individuals the liberty to make decisions regarding core attributes of their lives, which, under certain circumstances, includes how their lives end. Although the weight of the state's interest in life or the magnitude of the costs associated with an individual's loss of liberty if forced to endure his or her final days in intolerable pain are normative judgments, the empirical realities endemic to this clash of principles are readily determinable. A fair and just determination of constitutional cases cannot be achieved without a sound and accurate understanding of the world to which those decisions apply.

When facts are relevant under particular constitutional rules or standards, courts should strive to define and understand them separate from the constitutional norms that apply. If a regulation operates as an obstacle to the exercise of a woman's constitutionally protected right to a pre-viability abortion, for instance, that fact can be independently determined. Once it is determined—albeit with all of the limitations and caveats associated with doing this research—courts can separately resolve whether the obstacle is “substantial” or the burden it puts on the right is “undue.” Similarly, the factual question of whether physician-assisted suicide increases the incidence of involuntary euthanasia is a component of, but independent from, the constitutional norm of whether physician-assisted suicide is a protected fundamental right. Even the most fundamental of rights, such as political speech, can be regulated if the government's interests are sufficiently compelling. Good research on physician-assisted suicide should demonstrate whether the dangers of this practice provide a compelling justification for prohibiting it. By keeping constitutional value-definition separate from constitutional fact-finding, the analytical bases for constitutional outcomes will be clearer and thereby more legitimate.

III. CONCLUSION

The question whether a world exists independent of our minds' perception of it would probably appear quite absurd to the average lawyer or judge. The justices of the Supreme Court would undoubtedly be amazed to be asked such a question. They almost certainly subscribe to basic realist tenets, at least in the belief that the world is mind-independent. The justices would probably also share the realists' belief that while researchers' values sometimes affect the conclusions they draw about the mechanics of the "real world," the methods of science are well designed to limit or reveal those biases.

Yet, despite its likely realist orientation, the Court repeatedly treats facts in constitutional cases in anti-realist ways. In particular, the Court describes the factual world constructively, so that the facts serve normative or interpretive ends. The Court appears largely unconcerned with the actual reality of the factual premises it relies upon. Anti-realists may believe that this is an inevitable consequence of the task the Court faces in integrating highly complex empirical information into the intricacies of constitutional doctrine. In this essay, I argue that it is possible for the Court to employ a scientifically realist constitutional jurisprudence. In so concluding, I consider two principal challenges to a realist approach in constitutional cases. First, I reject the argument that the sorts of facts the Constitution makes relevant—primarily social and behavioral facts studied by social scientists—cannot be studied objectively. Second, I describe how constitutional tests that appear to be conglomerations of facts and values can be separated into their component parts. While these challenges are formidable, they are not insurmountable.

Constitutional rulings should be defined by the real world because they define the real world. The Constitution is an eminently practical document. Although cast for immortality, it is grounded in modern times and must attend to contemporary circumstances. As John Marshall put it, the Constitution was "intended to endure for ages to come, and, consequently, to be adapted to the various *crises* of human affairs."¹⁰⁷ A constitution that is interpreted in disregard of a sound understanding of empirical realities is exceedingly unlikely to endure.

¹⁰⁷ *McCulloch v. Maryland*, 17 U.S. (4 Wheat.) 316, 415 (1819) (emphasis in original).

